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is closely related to us, and that which we wonder at—that which moulds and instructs us, and that which we verily cannot excel even if we attempted it.

THE PHILOSOPHY OF MATHEMATICS.*

By RICHARD RANDOLPH.

The natural antithesis of Matter and Spirit finds expression in the Hegelian paradox that Being and Not-Being are identical. As all language is at best but the expression of impressions, and even current language only that of impressions generally prevailing, it is evidently in vain to demand absolute truthfulness in its use. Being indeed wholly symbolical in its nature, its very accuracy is contingent upon a certain degree of imagination in the parties to its use. Viewed as an ultimate rule, "the letter" thus necessarily "kills." It is enough that it be comparatively true, or that every new utterance shall exhibit a progress in the work of defining the independent consistency of truth, and its own dependent inconsistency. So far as Matter and Spirit are distinct ideas, Matter is certainly not Spirit, and Spirit is certainly not Matter. Whensoever, therefore, owing to the limitation of our natural faculties we may be conversant solely with the realm of Matter, while the changes in that realm actually indicate the presence of Spiritual Force, our impression of the result naturally suggests the expression that nothing is something. And, on the other hand, we may be so exclusively engaged in contemplating the higher or spiritual aspects of our experience, as to withhold from the lower even the restricted acknowledgment which is their due, and so with equal verisimilitude affirm that their something is nothing. Being and Not-Being, it might be thus argued, must be occasionally identical, until all antithesis shall be merged in synthesis,—until all mysteries shall be fathomed, at least so far as

* The Philosophy of Mathematics with special reference to the Elements of Geometry and the Infinitesimal Method. By Albert Taylor Bledsoe, A.M., LL.D., late Professor of Mathematics in the University of Virginia. Philadelphia: J. B. Lippincott & Co.

their mastery is contingent upon perfect self-knowledge and clear recollection or collectedness.

Physics, or the Science of unconscious Matter, and Metaphysics, or that of conscious Mind, the one embodying the secret principles of Mathematics, and the other those of Theology, may be said to be the parents, in human experience, of all the special sciences, or constituent branches of knowledge. The natural sciences of Botany and Zoology can no longer in any light be regarded as constituting a distinct realm, it being now thoroughly established, that to the mere statistician, or *a posteriori* student, there is no definable line of demarkation between the lowest manifestations of vitality and those of human intelligence; while to the *a priori*, and, if there be such a class, to the *a superiori* thinkers, unconscious vitality readily falls within the realm of physics. Even in the generation of Science, however, vice is transmissible from parent to progeny. There has never as yet been in the general consciousness any true marriage between Theology (or Metaphysics) and Mathematics (or Physics). The minor "ologies" have all been born out of wedlock, and deformity and discordance have been the more or less obvious results. The harmonizing of the parent principles may be said to be the great desideratum of our day.

Professor Bledsoe has done good service in this direction by the collation of authorities, and the devotion of much independent research in exposing some of the defects in accepted views of "the infinitesimal method," which has hitherto been regarded as a doctrine or aspect of mathematical truth peculiar to the Differential and Integral Calculus. The so-called "Transcendental Analysis" has been heretofore as great a bugbear to the young mathematician as the Transcendental Philosophy has been to the incipient metaphysician. Thanks to the new inspiration of which Dr. Bledsoe may be regarded as a pioneer exponent, Transcendentalism in Mathematics is now in a way to become, and so to be recognized as being, but "the perfection of common sense." He has made undeniable progress in that precision of language which attends coherency of thought, and which, by placing the student upon a firm ground of intelligence, furnishes him with the surest facilities for fresh

construction and widened exploration. Whether the train of suggestion which is thus started shall result in establishing the doctrine of Wedgwood that Space is only cognizable as a quality of Matter, so that all the demonstrations of Geometry must contemplate the presence of at least infinitesimal magnitudes, or whether it shall leave the hypothetical axioms of Euclid still standing in their isolated grandeur,—whether or not our author may have uttered the last word upon the mysteries of Nihilism and Infinity in his profound and entertaining chapter on those subjects,—we welcome this work as an important contribution to the reformation and advancement, not only of mathematical, but of all connected, and all dependent science. Traditional truth is ever precious. But the older the world grows, the more urgent is the necessity of our going behind tradition, for the very sake of estimating such truth at its just value. It may be a cure for the superstitious awe and paralyzing dread which often prevent competent minds (and what mind, if it have but leisure, is not competent?) from the pursuit of science, to be led to contemplate the glaring oversights which have befallen the most famous of its explorers at the very outset of their career, and the consequent inveterate confusion, almost consecrated sometimes by mere antiquity, which pervades the several departments of science as traditionally taught. The advance of all science towards the perfection of simplicity must reveal and correct such oversights and blunders, especially as the essential unity of the constituent departments becomes increasingly demonstrable, so that the results of each contribute to the illustration of all. As the reader may have observed, we question the permanence of the traditional doctrine which bases Mathematical Science upon intuition held to be independent of experience, and therefore indistinguishable from hypothesis, and anticipate the day when it will be avowedly built, with everything else which bears the name of Science, upon the foundation of pure observation.

There are but few instances in which Dr. Bledsoe seems to us to be himself open to criticism, of which few we think it only necessary to specify that he does not appear to recognize the important principle, that quantities may be inappreciably small in themselves, or in any actual combinations,

and yet have a definite value in their ratio to one another. This, to us, is *his* glaring oversight. But he may, we think, be said to have fathomed and rectified the intricacies of the Calculus so far as this can be done without extending a similar exhaustive research to the Philosophy of Mathematics in general; and he may be said at least to have "taken the bull by the horns" in commencing with the most difficult section of his subject. We await with interest the appearance of his treatise on Analytical Geometry, which we understand to be nearly or quite ready for publication, and of any future researches in the same spirit as those now before us, which, by exhibiting still more perfectly and forcibly the adaptation of all Mathematics to the service of the universal mind, may, by their reflected light, cast a much needed illumination on the universal laws of intelligence.

THEISM AND PANTHEISM.

[We have lately received from Dr. Franz Hoffman, Professor of Philosophy at the University of Würzburg, a pamphlet entitled "Ueber Theismus und Pantheismus, eine Vorlesung gehalten vor einer Versammlung, &c., zu Würzburg, am xiv. März 1861." Dr. Hoffmann is already known to our readers (Jour. Sp. Phil. vol. i. p. 190) as an ardent defender of the doctrines of Theism against Pantheism. He is spoken of by Dr. Rosenkranz (Jour. Sp. Phil. vol. ii. p. 55) as the "most distinguished representative of the Philosophy of Baader." Whether right or not in charging Hegelianism with Pantheism in any of its forms—e. g. disbelief in the immortality of the soul, or in the personality of God—all clear-minded thinkers will agree that his labors in behalf of Theism are commendable at least in their spirit. "God, Freedom, and Immortality," form the great triune principle on which is founded the only positive solution of the Problem of Life. It is with great pleasure, therefore, that we recognize in the sharp outline here given (which includes pages 8 to 13 of the pamphlet above mentioned—translated for us by Mr. Snider) the same essential purpose that we sketched in the logical superstructure forming the conclusion to our article on the Immortality of the Soul (Jour. Sp. Phil. vol. iv. p. 109). This demonstration, in which Dr. Hoffmann follows Professor Ulrici,